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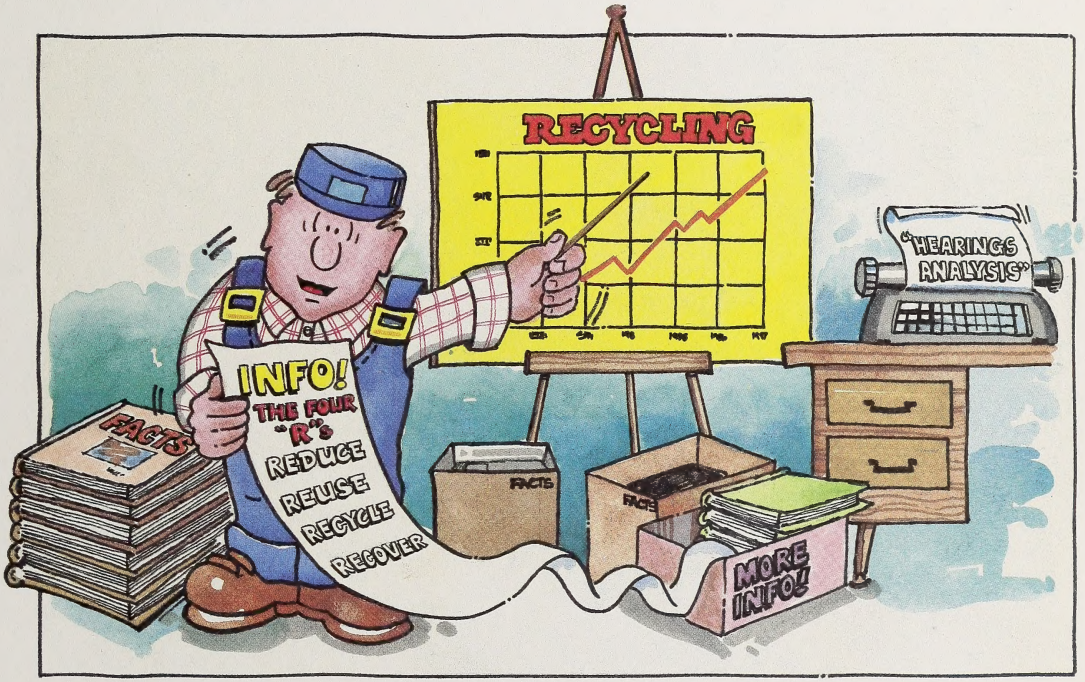
RECYCLING OF WASTE IN ALBERTA

Summary Report and Recommendations



Alberta
ENVIRONMENT COUNCIL OF ALBERTA

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RECYCLING OF WASTE IN ALBERTA
Summary Report and Recommendations

April 1987

Environment Council of Alberta

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ECA87-18/RR2

Lieutenant-Governor in Council
Legislative Building
EDMONTON, Alberta

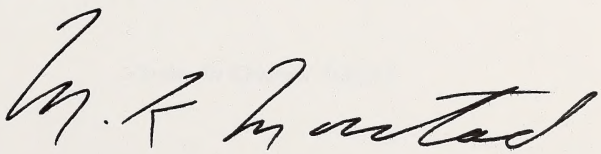
Honourable K. Kowalski
Minister
Department of the Environment
132 Legislative Building
EDMONTON, Alberta
T5K 2B6

Dear Sirs:

I have the honour to transmit, herewith, the Report and Recommendations of the Environment Council of Alberta on Recycling of Waste in Alberta, as required under Section 7 (1) (i) of the Environment Council Act (Chapter E-13 R.S.A. 1980).

I have the honour to be, Sirs,

Your obedient servant,



Merrill K. Morstad
Chairman, Recycling Panel
Environment Council of Alberta

TERMS OF REFERENCE

FOR PUBLIC HEARINGS ON THE RECYCLING OF WASTE IN THE PROVINCE OF ALBERTA

The Environment Council of Alberta is hereby requested to:

1) Enquire into the potential for the economic recycling of products presently disposed of as wastes; giving particular attention to:

   a) the potential, scope, and obstacles to increased recycling by private sector business enterprises;

   b) the potential, scope and obstacles to increased recycling by volunteer organizations;

   c) the support role of local governments and the provincial government in facilitating recycling by the private sector and volunteer organizations, considering the potential reduction in waste disposal costs, the enhancement of the environment and privatization.

2) Consider the potential and comparative economics of the generation of energy from wastes when the alternative of the creation of useful goods and services from wastes is not feasible.

3) Hold public hearings at suitable locations throughout the province, and report to the Minister of Environment and the Lieutenant-Governor in Council on completion of the report.

– Order In Council 106/85

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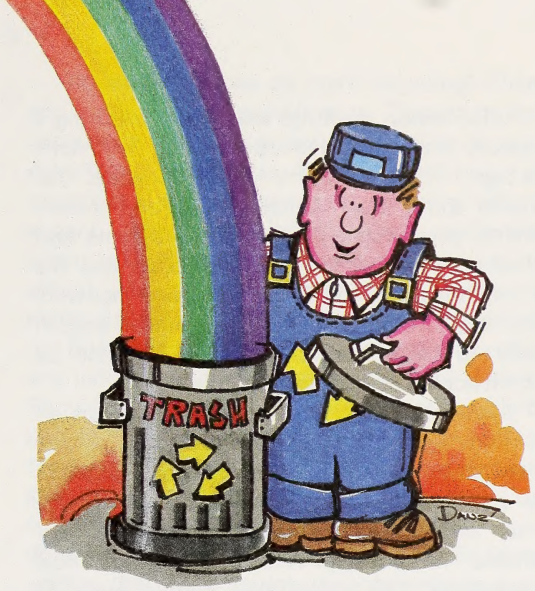
INTRODUCTION



Recycling exists in Alberta today because of the outstanding efforts of volunteers, because of the intrinsic value of materials or markets enhanced by regulation, and because of modest but effective provincial programs. The full potential of recycling in Alberta, however, has not been achieved. Recycling can be substantially expanded so that less material is wasted and more is recycled for the betterment of Alberta's economy and environment. How this potential could be achieved is what the provincial government asked the Environment Council of Alberta when, in 1985, it requested the Council to conduct an enquiry and hold public hearings to find ways of encouraging the recycling of materials presently disposed of as waste. Order in Council 106/85, February 20, 1985, gave the Council the terms of reference for the enquiry. On April 3, 1986, a panel was appointed by Order in Council 244/86 to conduct the Council's hearings. The Panel consists of:

Merrill K. Morstad, Chairman. *Mr. Morstad, a resident of Edmonton, held various positions with Renn Sales Edmonton Ltd. including President and General Manager, was Past President of the Alberta Farm Equipment Wholesale Association, and has been active in many community groups.*

Alistair D. Crerar, Vice-Chairman. *Mr. Crerar is Vice-Chairman of the Panel by virtue of his position as Chief Executive Officer of the Environment Council of Alberta. Mr. Crerar is an economist and planner.*

David Chan, Member. *Mr. Chan, an architect who graduated from McGill University, is currently practicing in Calgary. He is active in charitable and volunteer community work, including the Calgary Chinatown Lions Club.*

Robert M. Jones, Member. *Mr. Jones is retired from farming and lives in the Warner area. He is involved with a number of local community activities, including the Warner Chamber of Commerce, the Elks Club, and the Border Counties Hospital Board.*

Gordon Osgood, Member. *Mr. Osgood worked for many years at Domglas in Redcliff. As well, he has been active in numerous service organizations, including the Redcliff School Board and the Redcliff Planning Commission.*

The Hearings

In preparation for the hearings, Environment Council staff researched and wrote a series of background reports on recycling and energy from waste. These reports are listed in the Appendix. Prior to the hearings, the Environment Council also made a substantial effort to contact people who might be interested in recycling. These included the general public, people involved with volunteer organizations and recycling projects, people in industries directly or indirectly affected by recycling or the recovery of energy from waste, generators of potentially recoverable waste, enterprises interested in the use of recovered materials, and government officials at all levels.

Information meetings were held, featuring a specially prepared video tape entitled *One Man's Garbage, Another Man's Gold?*, a panel discussion about local recycling issues and present Alberta government policies and programs, and information about the hearing process and the Council's role and mandate. Public hearings were held at 11 locations across the province and, in total, 134 briefs were received, including 23 submissions received after the hearings.

Excellent submissions were received at all locations and the Panel expresses our sincere appreciation to those people who participated in the hearings or took the time to write to the Panel about their concerns and recommendations. The variety of views expressed was most appreciated. The effort that people made to attend the hearings or to share their ideas and concerns with the Panel was an inspiration to us as we worked toward developing a comprehensive set of recommendations for the province.

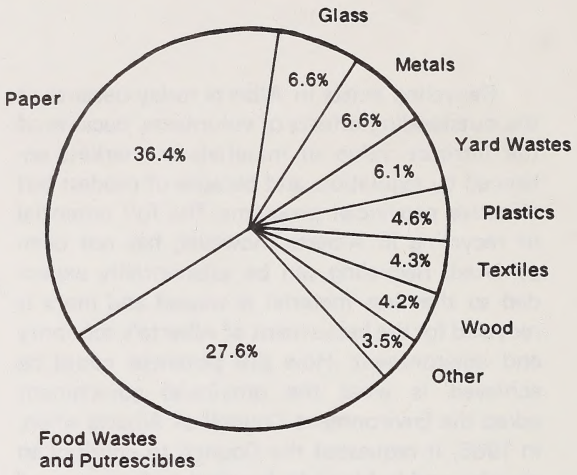
After the hearings, the Panel met with 25 government and non-government agencies whose policies and programs could have an impact on recycling in Alberta. The Panel also visited many recycling projects and industries in Alberta. In addition, members of the Panel attended conferences, met with government officials, and visited recycling operations in Ontario, British Columbia, and Washington State.

The Current Waste Management Situation

Alberta's diverse economic development has resulted in a variety of waste materials, waste management problems, and waste management systems. The wastes that must be dealt with include those from the entire range of industries as well as schools, hospitals, construction sites, office buildings, farms, and commercial enterprises, and the variety of materials that individuals discard as household garbage. Approximately 1.8 million tonnes of solid waste is landfilled annually in Alberta, averaging almost 800 kg per person each year.

FIGURE 1

Composition of Municipal Waste in Canada



Information about the composition of the waste stream provides a starting point for improving our waste management system.

The volume of waste produced is increasing, and so are waste management costs. An estimate of $86 million has been made for total disposal costs in Alberta in 1984. The increase in costs is due to the ever-larger volume of waste being generated as well as higher operating and capital expenses for improved waste management. Higher standards in waste management are being developed and sanitary landfills and transfer stations are replacing scattered, open, and often smoldering dumps.

General Impressions

There was one notable overall impression gained through the enquiry. No one, in any capacity, was against recycling. There were those who felt that others (not themselves) were not sufficiently motivated to make the extra effort that recycling requires. There were many who felt

that low population density and high transportation costs make the economic viability of additional recycling doubtful in Alberta. But even the skeptics wanted recycling to succeed and had helpful suggestions to overcome the barriers.

Albertans we heard from at the hearings were proud of their province and valued its cleanliness. They saw the recycling we have done so far as contributing to the tidiness and beauty of the province and they heartily approved of the results. It is the Panel's overall impression that there is substantial support for recycling and its perceived beneficial results.

In Alberta today, the recycling industry employs more than 3,500 people and produces goods valued in excess of $300 million. This industry is based on the utilization of materials removed from the municipal solid waste stream. Management of the remainder of the wastes cost Albertans about $86 million in taxes and charges in 1984.

When you ask Albertans if it is better to spend $86 million per year to put wastes into landfills in the hope – not the certainty – that the material will be rendered innocuous, or to use that material to expand an industry that produces useful goods and productive jobs, you would receive the kind of answer that the Panel did at the public hearings on recycling. Virtually everyone is in favor of recycling, almost no one favors landfilling as the only means of waste disposal, and no one wants a landfill as a neighbor.

Although landfilling may seem to be an inexpensive solution to waste management problems, it offers few benefits other than burying wastes out of sight and out of mind. Landfilling still poses a number of social and environmental liabilities. These liabilities may include odor, dust, noise, traffic, and litter during the operating life of the landfill. As well, there are post-closure concerns about long-term environmental and health effects of leachates and gases from landfills. Future productive use of the site also is compromised. In many ways, landfilling is not a treatment system but more a means of storage. Because recycling can provide a safe, certain solution for a substantial portion of the waste stream, it has become increasingly attractive as an alternative to conventional waste disposal methods.

So why don't we do more recycling? There are a number of impediments. Transportation costs are a major deterrent to recycling in rural Alberta and, in all areas, the cost of collection of materials is a major factor. If recycling efforts expand, then participation rates, collection costs, and the ability of existing markets to accept the increased volume of recovered materials are all factors that must be considered.

But a major factor is that we judge recycling and landfilling by two entirely different criteria. Recycling is considered an economic activity like any other. It is expected to pay full cost for the acquisition of its raw material – collection, storage, and processing. It may be abetted in the collection phase by volunteer groups who donate their labor, or assisted by a bottle depot system that has been set up principally to keep Alberta unlittered, but essentially recycling is expected to pay the full cost of acquiring its raw materials.

On the other hand, those same raw materials, discarded into the waste stream, become an uncontested charge on the public, with only a few municipalities in the province charging for waste disposal on a "user pay" basis. Most of the population pays for waste disposal out of municipal taxes and it therefore appears to be a virtually "free" service of municipal government.

The Choices

Albertans have a choice: they can plug into a waste disposal system whose only requirement is that you put garbage down the chute or at the back of the property for pick up and disposal by a complete and seemingly costless system. The alternative is to separate out newspapers, glass, metal, and oils, store them until sufficient volume has been collected, and then try to contact elusive (except for beverage containers) recyclers who often find the small amount of waste recovered from an individual household more trouble than it's worth. With those choices, it is surprising that recycling is undertaken in the province as much as it is. The Panel concludes that a basic change in attitude toward waste management will have to underlie any major

expansion in the rate of recycling and volume of wastes recycled.

That basic change is to provide a level playing field for the choice between garbage collection followed by landfill disposal, and materials recovery and recycling. At present the major difference between the two approaches is that it is easy to create garbage and difficult to segregate and store waste products, the essential first steps for a successful materials recovery program.

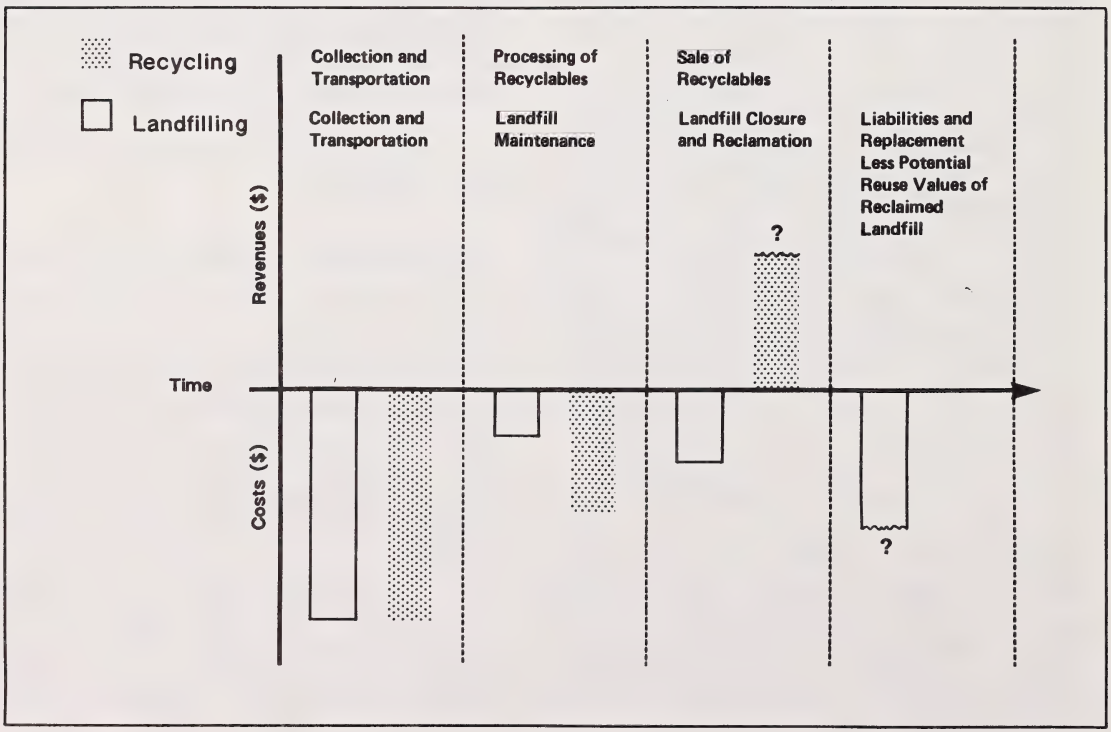
Fortunately, the participation rates that are evident in Ontario and lately in the Edmonton experiment with curbside collection suggest that householders are willing to make the extra effort that is required to segregate recyclables, if after that segregation their removal is no more difficult than disposing of garbage. For somewhere between 70 and 80 percent of the population, the commitment to recycling is sufficiently strong that, given easy access to a recycling system, they are willing to undertake the necessary separation and storage.

The example of one of the more successful of the recycling sectors — metals, both ferrous and nonferrous — is instructive. The portion of metal scrap that is recycled is high. Industrial waste generators recycle because they have to pay the full cost of collecting and hauling if they wish to dispose of metal waste in a landfill. The recycling alternative is easier and potentially profitable, since scrap dealers often provide collection bins for major generators and pay for the scrap.

There are important differences in the overall pattern of the incidence of costs and revenues over time, depending on whether wastes are recycled or landfilled (see Figure 2).

FIGURE 2

Comparison of Costs and Revenues for Landfilling and Recycling



SPECIFIC RECOMMENDATIONS

The following pages summarize the recommendations resulting from the Panel's enquiry. The recommendations are based on the information gathered during the enquiry and the knowledge and experience of the Panel members.

This summary report does not provide a full and complete rationale for all of the recommendations. Such a rationale can be found in the companion technical report (available from the Environment Council Library), and readers should consult the technical report for more detail.

Level Playing Field for Recyclable Materials

The core of the Panel's recommendations is the need to remove the discrepancy between garbage collection and disposal, a public service that is usually heavily subsidized, and recyclable materials collection and recovery, normally provided by industry or volunteer groups with little or no support from the public purse. It is to eliminate this bias toward garbage collection and landfill disposal that the Panel recommends the following actions:

Recommendation 1: *The Government of Alberta should adopt, as a policy, the principle of "user pay" for municipal waste management systems.*

As long as waste management costs are carried predominantly by the public sector, there is no incentive to the manufacturer, distributor, or user to reduce waste or increase recyclability. Adoption of the user pay principle would force recognition of the costs of waste disposal and place recycling on a more equitable economic footing with disposal alternatives.

A number of municipalities in Alberta operate waste management systems on a "cost-recovery" basis, with the present cost being covered by the revenues. This is a major first step toward implementing the user pay principle and much can be learned from these municipalities.

The "user pay" principle encourages recycling rather than out-of-sight, out-of-mind landfilling of wastes.

Recommendation 2: *A comprehensive study should be undertaken by Alberta Environment and Alberta Municipal Affairs to determine the conditions for operating municipal waste management systems on a cost-recovery basis. The study should include an analysis of transferability of such approaches to other municipalities.*

It was suggested, both at the hearings and by other technical sources, that the true or full social costs of landfill disposal were not being included in current charges or tipping fees for municipal landfills. Because the current low cost of landfilling inhibits alternative methods of disposal such as incineration or recycling, the federal Department of Energy, Mines and Resources is sponsoring a study to arrive at the true cost of landfilling. It is the Panel's impression that the next generation of landfills, even in Alberta, are going to be very difficult to locate and substantially more expensive to obtain.

Recommendation 3: *Alberta Environment and Alberta Municipal Affairs should develop a methodology for the full assessment of landfilling costs, determine those costs for a variety of Alberta situations, and maintain an information base on true landfill costs for use by Alberta municipalities. It would be desirable to integrate the Alberta cost analysis with that being conducted by the federal Department of Energy, Mines and Resources, to avoid duplication and to integrate methodologies as much as possible.*

The Panel believes that the underestimation of landfilling costs is a major barrier to both recycling and energy-from-waste alternatives. Development of a methodology for assessing the full costs of landfilling would allow municipalities to more accurately assess waste management options and to make prudent waste management decisions.

The following recommendations are intended to remove programs at the municipal or provincial level that preferentially support garbage collection and landfill disposal over alternative methods of managing waste. The Panel believes that waste generators need not be shielded from the cost of waste disposal; indeed, little increase in the use of alternatives is likely until the reality of waste disposal costs is faced.

Recommendation 4: *The Municipal Government Act should be amended to require that waste management be treated as a utility, and be self-supporting on the basis of revenue generated.*

Treating waste management as a utility would provide both waste managers and waste generators with a clear understanding of the costs of waste management and the relationship between waste generation and disposal costs.

However, another step is required: removal of government financial assistance for landfilling. The provincial government funds a program that encourages the development of regional landfills. By making special assistance available for regional landfills, the province is showing a preference for landfilling as a waste management option and

What is the true cost of landfilling? Opportunity costs, and health, social, and environmental costs for future generations should all be considered when calculating the cost of landfills, but rarely are.

creating an artificially low cost for landfilling. Shifting this funding to a program that would cover start-up costs for economically viable recycling enterprises would not only provide an incentive to recycle but also would help to establish the true costs of landfilling.

Recommendation 5: *Alberta Environment should phase out its capital assistance program for development of regional landfills and make the funds that are freed up available as incentives for recycling.*

Theoretically, waste generators should pay on the basis of the amount they generate. Where flat rates are charged or where funding from general revenues is used to cover costs, there is little incentive to reduce waste. Metering of waste and basing disposal charges on the amount of waste produced is one means of passing on the cost of disposal to the waste generator. Several such systems are in place in other jurisdictions. The Panel agrees that metering of waste is desirable, but is not convinced that any particular system has been shown to be sufficiently simple and effective to recommend that it be adopted.

Recommendation 6: *Alberta Environment and Alberta Municipal Affairs should examine the practicality of different methods of "metering" waste collection and charging accordingly. Information obtained should be developed in a form that is readily accessible to municipalities to allow them to choose the metering approach that most adequately fits their situation.*

The Panel is aware that landfill disposal will be required for many years into the future. However, we also believe that the public will demand, as a precondition before considering the location of any new landfill sites, the assurance of "best efforts" in developing alternatives to landfilling. Any municipal authority that, in the future, suggests that it is a public duty to provide landfills as the only method of waste disposal will, on that basis alone, have provided the inevitable NIMBY (Not In My Back Yard) group with an excellent basis for opposition to a new landfill site.

The Four R's of Waste Management

There will always be some residual wastes and therefore a real need for new landfill sites. However, there is also an opportunity to put less and less into landfills as time passes. An ultimate goal is to reduce garbage production and to maximize that portion of the waste stream that is reused, recycled, or recovered. There is no easy remedy, no program that will enable recycling to instantly replace our present methods of garbage disposal. To begin the task of replacing garbage disposal with materials recovery as the chief method of waste management, the Four R's of waste management should be adopted by the Alberta Government as its principal policy of waste management.

Recommendation 7: *The Government of Alberta should adopt the "Four R's" – reduce, reuse, recycle, and recover – as its policy and priority sequence in waste management.*

A commitment to the Four R's of waste management should result in a close examination of the Government's own waste management practices as well as careful scrutiny of the impacts of government policies on recycling in the private and volunteer sectors.

Reduce

Reuse

Recycle

Recover

The Four R's of Waste Management represent a strategy for efficient and effective conservation of resources.

Reduce

The first of the Four R's is reduce. The aim is to halt the production of wastes before it starts. Excessive packaging and the design of products to reduce waste or improve recyclability are significant problems for individuals and private enterprises concerned about recycling. But improvement in product design and packaging are areas in which the federal government is the most influential decision maker.

Recommendation 8: *The Minister of Environment should request the federal government to conduct a study of the impact of product design and packaging upon waste disposal costs and upon the environment. The objective is to establish a set of rules or guidelines for goods marketed in Canada which would:*

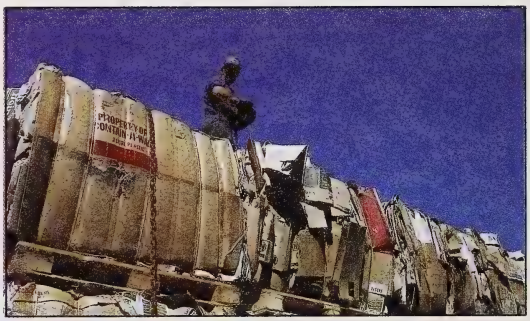
1) reduce waste generation
2) maximize reuse of resources
3) provide for recycling
4) facilitate resource and energy recovery.

Recommendation 9: *The Minister of Environment should request the federal Department of Consumer and Corporate Affairs and Environment Canada to examine the feasibility of a surcharge or checkoff at the manufacturer or import level that is related to the extra disposal costs generated by non-recyclable packaging, wrapping, and container materials and by products that are difficult to dispose of, such as rubber tires.*

To the Panel it seems inequitable that a substantial portion of a packaging material like corrugated cardboard is collected for recycling without charge to the public, while most plastic packaging material can only be disposed of in the garbage at substantial cost.

Based on current costs of incineration, the checkoff or surcharge recommended above would be approximately $50 per tonne of material produced or imported. The funds should go into a research and development fund to search for ways to increase the proportion of material recycled. The checkoff could be lifted once the research and development had been shown to be effective by, for example, raising the percentage of plastic packaging materials recycled to the level of paper and ferrous metals.

Polyethylene terephthalate (PET) plastic bottles are one of the few plastic packaging wastes for which a recycling pathway is being established.



Well-established recycling pathways reduce the amount of paper that must be landfilled.

A major fraction of waste streams is yard wastes and other putrescibles (putrescibles are all kinds of organic materials subject to biodegradation). All of these materials, and particularly yard waste (grass clippings, leaves, and twigs), can be successfully composted. An increase in composting could significantly reduce the volume of waste generated per household. Individuals could be encouraged to compost by providing them with "how to" information.

Recommendation 10: *Alberta Environment should develop an information package on backyard composting methods and the advantages of composting.*

There is an excellent opportunity available to collect data and assess the impact that composting may have on the amount of household waste discarded. By adding composting to the curbside recycling project in place in Edmonton, Alberta Environment and the City of Edmonton could gain additional benefit from the information base that is being developed about the overall impacts of recycling on waste disposal. Depending on the results, the composting program could be expanded to other municipalities.

Recommendation 11: *Alberta Environment and the City of Edmonton should implement an experimental composting project in those areas of Edmonton currently served by the curbside recycling project.*

Organic material from households is only a portion of the organic material in municipal solid waste. Substantial amounts of organic matter are also collected from parks, boulevards, tree trimming, and other sources. This material could be composted at areas set aside at the landfill, using equipment available there, or at other suitable locations. The result would be production of a usable commodity, as well as savings in landfill space, savings in disposal costs, and an improved public image.

Recommendation 12: *Alberta Environment should work with large producers of organic material, such as city parks departments, zoos, and racetracks, to encourage the establishment of composting areas at landfills or other suitable locations.*

In 1985, about 22 percent of the material disposed of in the Cloverbar landfill in Edmonton was construction rubble. The proportion has been as high as 50 percent at the height of the construction boom in 1981. There is no need for this relatively clean waste to take up scarce space in a sanitary landfill.

Recommendation 13: *Alberta Environment and Alberta Municipal Affairs should establish a system for advertising the locations of disposal sites that would be willing to accept construction and demolition rubble.*

When the service is fully established, municipalities should consider banning the burying of construction rubble in sanitary landfills. However, this may not be necessary if tipping fees are raised to reflect the true cost of providing landfill.

Reuse and Recycle

Actions that will support reuse will aid recycling and vice versa. The backbone of government support to reuse and recycling in Alberta is the Beverage Container Act. This has been an unique approach to the universal problem of littering of beverage containers and has promoted their reuse and recycling. The Panel believes that the Beverage Container Act has been extremely successful and our recommendations are intended to update, improve, and build upon this success. The following recommendations relate to the Beverage Container Act specifically. Their basic objective is to treat all beverages (except milk) and all container materials equitably. The Beverage Container Act should be as neutral as possible to allow various types of containers and beverages to compete on the market without an advantage, in cost or convenience, gained from an Act whose principal objective is to reduce littering.

The Beverage Container Act has resulted in accumulation of resources rather than their dispersal through littering.

A first step in enabling the Act and the universal depot system to better respond to changes in beverage markets and packaging types is to include the widest possible range of beverages and beverage containers.

Recommendation 14: *The Beverage Container Act and its regulations should be amended to include all beverages sold in all types of sealed containers, except milk or milk products.*

Deposits on "Tetrapak" containers would encourage development of a recycling pathway, as was the case with plastic bottles.

The purpose of a deposit on beverage containers is to encourage their return and keep them from being discarded into the environment. A uniform deposit is the simplest means of operating the return system for the bottle depot operator, the retailer, and the customer.

Recommendation 15: *A single minimum deposit level should be placed on all beverage containers, except those used for milk and milk products.*

The deposit should be sufficiently large to encourage the return of the containers. A higher deposit increases the return rates, although return rates vary depending on the container type. A deposit of 10 cents would be sufficient to achieve high return rates, without drastically affecting the sale of single-serving containers, many of which currently have deposits of 10 cents.

Recommendation 16: *A uniform minimum deposit of 10 cents should be set for all containers included under the Beverage Container Act.*

At the public hearings, there were suggestions that universal depots were less efficient than they might be and that there was a temptation for operators to ask for higher handling charges rather than increasing efficiency and productivity. The best way to increase efficiency, in the Panel's view, is to provide for greater competition.

Recommendation 17: *In order to increase the number of universal depots, Alberta Environment should relax the licensing policy concerning the number and locations of these depots.*

The Panel believes that, when bottle depots are established, they also should be able to achieve some other useful social objectives. These would include aiding recycling by accepting recyclables other than beverage containers (corrugated cardboard, newspaper, non-beverage container glass, used lubricating oil).

Recommendation 18: *Alberta Environment guidelines for universal depot licences should include special consideration of proposals that include recycling of commodities not covered by the Beverage Container Act.*

Universal depots have been an important feature of handicapped or sheltered workshops and in this way make a significant contribution to the social well-being of the community.

Recommendation 19: *Applications for the establishment of universal depots as sheltered workshops, or as part of a sheltered workshop, should be considered favorably by Alberta Environment and refused only under exceptional circumstances.*

Implementation of the above recommendations will have substantial impacts on the

operation of the universal depot system and adjustments in the present level of handling charges likely will be required. Before any adjustments are made, time is required to allow the system to adjust to the other changes in the scope of the Act and the operation of the universal depot system.

Recommendation 20: *A two-year freeze should be placed on handling charges to allow the universal depot operators time to adjust to changes to the Beverage Container Act. During this freeze, there should be a thorough examination of the system in order to determine appropriate handling charges.*

Another current program that assists recycling and protects the environment is the Oil Drop Program. As a result of this program and the efforts of the private and volunteer sectors, about 20 percent of the lubricating oil sold in Alberta is recovered for re-refining. The Oil Drop Program would benefit from increased publicity.

Recommendation 21: *Alberta Environment, in conjunction with local government, should develop an effective information program to publicize the use of the Oil Drop Program and oil collection tank network.*

Alberta Environment's Oil Drop Program is designed to promote collection of used oil for recycling.

The Pesticide Container Collection Program is an important assist to recycling and an effective method of reducing environmental pollution in rural Alberta. The steel containers that are collected are recycled as steel scrap and thus any harmful residues are destroyed in the steel furnaces. Plastic pesticide containers and their residues, however, are landfilled, because there is no economical way to clean and recycle the plastic. Until such time as a satisfactory cleaning and recycling process is developed, the disposal of these non-recyclable, non-reusable containers poses a threat to the environment and imposes the costs of proper management on society.

Recommendation 22: *The Government of Alberta should recommend to Agriculture Canada that it ban all pesticide containers that are not safely and economically recyclable or reusable.*

Over 643,000 empty pesticide containers were collected in 1985 through the Pesticide Container Collection Program.

If the federal government permits the use of non-recyclable or non-reusable containers for pesticides, then it should bear the cost of their proper disposal.

Recommendation 23: *Agriculture Canada should contribute funds to Alberta to cover the costs of its Pesticide Container Collection Program.*

The Panel identifies the Resource Recovery Grant Program as a particularly cost-effective provincial program. This is because it provides a means of obtaining for local recycling efforts the essential up-front capital funding that allows them to get established. The Panel recommends:

Recommendation 24: *The Alberta Environment Resource Recovery Grant Program should be continued with increased funding so that volunteer recycling efforts can be provided the essential boost that they often need in the form of capital equipment to get recycling projects started.*

Recommendation 25: *Alberta Environment should expand the Resource Recovery Grant Program to include recycling businesses as well as non-profit recycling projects.*

In making the recommendation to extend the Resource Recovery Grant Program to recycling businesses, the Panel was not considering the larger waste management firms or major recyclers. Elsewhere in this report, increased access to the Accelerated Capital Cost Allowance program, as well as improved availability of business development programs at the federal and provincial level, are suggested, which would be more attractive to larger capital-intensive businesses. The Resource Recovery Grant Program would be more suitable for small, local businesses, of under 10 employees with very small capitalization.

Recover

The final "R", recover, includes the recovery of energy from waste. Energy recovery does not have the same potential as reuse and recycling to produce useful, high-value goods. However, in conjunction with proper operation of a well-designed and well-maintained incinerator, energy recovery also provides safe destruction of wastes, a substantial reduction in volume, and a residue of known or measurable composition. The basic problem is that the high cost of incineration is only partly compensated by the ability to recover heat. In many other jurisdictions, the value of energy from waste is sufficient to make incineration an economically viable alternative to landfilling. In Alberta, the energy province, there will be few instances when energy from waste will be competitive.

STANLEY ASSOCIATES ENGINEERING

The recently completed waste incinerator for the University of Alberta Hospitals uses heat generated by incineration to produce steam for heating, as well as providing safe, efficient disposal for potentially hazardous hospital and biomedical wastes.

However, there will be instances when incineration will be the preferred waste disposal option and, for those instances, energy recovery considerations should be an integral part of the proposal.

Recommendation 26: *Alberta Environment should modify current incineration guidelines to require incineration proposals to include consideration of energy recovery in the design, siting, and operation of the facility.*

Concerns have been expressed about the environmental and economic implications of incineration. These aspects must be thoroughly researched under Alberta conditions.

Recommendation 27: *Alberta Environment should ensure that sufficient research is done under Alberta conditions to establish the desirability of incinerating municipal solid waste from an environmental and economic perspective.*

Alberta Environment should take advantage of the information being generated by federal government incinerator testing programs and by research in Alberta, as well as through operation of the incinerator at Wainwright, to ensure that the appropriate decisions are made about incineration of municipal solid waste.

Recommendation 28: *Alberta Environment should revise current incinerator guidelines to incorporate new information or experience under Alberta conditions before any additional incinerators are permitted to burn municipal solid waste.*

Recommendation 29: *Since proper operation of incinerators is just as essential as good design, the Province should develop, or adopt from other Canadian jurisdictions, training programs, certification standards, and testing practices that will help ensure adequate skills and operational proficiency for those who operate waste incinerators.*

Markets are the key to successful energy-from-waste projects. However, some of the current formulae for charging customers for electricity discourage energy conservation and reduce the attractiveness of generating electricity from alternative sources such as municipal solid waste.

Recommendation 30: *The Public Utilities Board and Alberta Energy should conduct a review of utility rate structures with the intent of removing unnecessary barriers to the recovery and use of energy from waste.*

Information and Education

A very prevalent theme of the public hearings was that the success of recycling in the long term would depend on a multifaceted information program. The program would involve elements that would enhance understanding of the potential for recycling in the population at large as well as elements focusing specifically on the formal school system.

Within the school system, the Panel believes the following recommendations would be helpful:

Recommendation 31: *The Minister of Education should ensure that when the Alberta school curriculum is reviewed, waste management and recycling are included as an integral part of the curriculum – as part of the knowledge base expected of Alberta citizens.*

Recommendation 32: *Alberta Environment in conjunction with Alberta Education should develop and circulate an information kit describing extra-curricular activities or projects that could be used in Alberta classrooms to encourage recycling habits.*

Recommendation 33: *Alberta Education, the Alberta Teachers' Association, and the Alberta School Trustees' Association should ensure that the Four R's of waste management are included in teachers' in-service training.*

Additional resource materials focusing on the Four R's of waste management should be developed for use in Alberta schools.

Recommendation 34: *ACCESS Alberta should produce a series of audio-visual resource materials based upon the Four R's of waste management.*

The Alberta school system is a major institution that consumes a vast amount of materials and generates large quantities of waste. A careful examination of waste management in the school system by both the school boards and by individual schools could result in savings in waste disposal costs as well as provide an excellent example for the students and the community.

The intent of the following three recommendations is to ensure that, in the administration and daily operation of all Alberta schools, every opportunity is taken to teach the Four R's of waste management by practical example. Some examples would include support for school bottle drives; paper recycling; urging Home and School Associations to sponsor flea markets, rummage sales, garage sales; and so on. The school system should also take the lead in promoting the use of recycled products.

Recommendation 35: *Alberta Education should direct Alberta school boards to examine and improve the operation of the Alberta school system to better reflect the Four R's of waste management.*

Bottle drives are a way of learning about recycling by doing it.

Recommendation 36: *Alberta Education should encourage schools to recycle paper and other recyclable materials that are currently being incinerated or otherwise disposed of.*

Schools are major users of paper. The use of recycled paper in the schools would provide a boost to the market for recycled paper and increase its use in Alberta.

Recommendation 37: *Alberta Education should provide Alberta school boards with information about the availability and cost of recycled paper and encourage the boards to take advantage of opportunities to purchase recycled paper.*

For the general public, programs that increase overall awareness or make it easier to recycle would be useful. The Panel was most impressed by the effectiveness of the federal *Participaction* program. If something with as much flair and impact could be developed for the Four R's of waste management, the concept would be better understood and more appreciated.

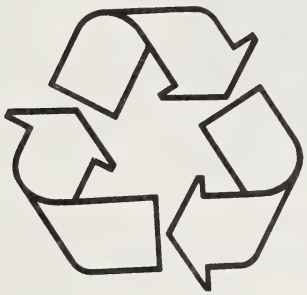
Recommendation 38: *The Minister of Environment, through the Canadian Council of Resource and Environment Ministers, should encourage the federal government to develop and implement a public awareness program focusing on the Four R's of waste management: Reduce, Reuse, Recycle, and Recover.*

If consumers are to take personal action to reduce waste generation or to recycle useful material, they must be provided with information with which to guide their decisions.

Recommendation 39: *Alberta Consumer and Corporate Affairs should develop a consumer education program aimed at reducing the quantity of waste generated by consumer goods and services. This program should focus on reuse, recyclability, repairability, and durability of products, as well as product packaging.*

A well-recognized symbol, accompanied by an appropriate phrase, also would facilitate the identification of favored products that are easily recycled or contain recycled materials.

Recommendation 40: *Alberta Environment should promote the development of a national recycling symbol. This symbol should be displayed with an appropriate message indicating whether the product is recyclable or contains recycled material.*



Variations on this basic recycling logo are used widely to indicate either use of recycled materials or product recyclability.

A major current barrier to recycling is the lack of knowledge of where used materials can be recycled. A mechanism is needed by which the public can easily obtain information about different recycling programs, recycling opportunities, and local markets for recyclable materials.

Recommendation 41: *Alberta Environment should establish a toll-free telephone service for information about recycling in Alberta.*

Computer modelling is now used in waste management to plan efficient collection routes, analyze costs, maintain records, and, more recently, to assist municipalities in evaluating the potential for incorporating recycling into their municipal waste management services. The Environment Council of Alberta has experimented with a computer model developed for the State of Ohio. The test results suggest that certain recycling programs could generate revenues for municipalities. The information available from the Recycling Computer Model would help municipalities decide whether additional recycling makes sense in their particular situation.

Recommendation 42: *Alberta Environment should evaluate the Recycling Computer Model and make modifications to improve its relevance for Alberta. The Department should then make this computer program available to municipalities for use as a planning tool for waste management services.*

Equitable Treatment for Recycling Enterprises

In the long run, for recycling to be successful, it must become a viable business enterprise. Today recycling is expected to compete in the market for waste materials against a highly subsidized, publicly financed waste collection and disposal system. The Panel has made recommendations to provide a level playing field with respect to the competition for raw material supply. However, recycling also faces penalties at the manufacturing level that should be removed, and there are instances where assistance available for the processing of virgin materials should be available equally to processors of recyclable materials, so that recyclers are not penalized because of the raw material they use.

Recommendation 43: *The Alberta government, through the Minister of Environment, should urge the federal Minister of Environment to initiate action within the federal government to treat recyclable goods and materials and virgin materials in an equitable manner with respect to taxes, exemptions, and industrial development programs.*

The Accelerated Capital Cost Allowance (ACCA) for pollution control equipment provides for the depreciation of such equipment at the rate of 25 percent in the year of purchase,

Oil re–refiners such as Hub Oil in Calgary perform a valuable function, but have to compete with producers of virgin materials.

50 percent in year two, and 25 percent in year three. Recycling is certainly one method of reducing or controlling pollution. If recycling processes were eligible for the ACCA, this would help to rectify the preference provided to virgin materials, provide an incentive for industry to increase their use of recycled materials, increase the demand and price for recycled materials, and contribute to a reduction in pollution.

Recommendation 44: *The Alberta Minister of Environment should bring before his colleagues on the Canadian Council of Resource and Environment Ministers the recommendation that all capital expenditures associated with processing of recyclable materials be eligible for the Accelerated Capital Cost Allowance (ACCA) for pollution control equipment on the basis of the percentage of recyclable material used.*

This recommendation would place the recycling industry on approximately equal footing with virgin material using industries that are eligible for depletion allowances.

Better use could also be made of available industrial development grants. Plants that process and upgrade recyclable materials should be considered for the same level of support as manufacturing plants on the basis that they reduce disposal costs while they create new materials.

Recommendation 45: *The recycling industry should be considered a manufacturing industry and should be eligible for the full range of industrial development grants.*

The oil re-refining industry is suffering from the fall in crude oil prices and, if assistance is not given, the industry could collapse. The Province should recognize the savings in environmental protection and waste management that result through re-refining used oil. These savings should be available to any company that is willing to establish modern, environmentally sound, oil re-refining technology in Alberta.

Recommendation 46: *Alberta Environment should investigate the merits of providing a one-time capital grant to assist any company willing to develop a modern used oil re-refinery in Alberta. The levels of assistance should be comparable to those provided for such projects as heavy oil upgraders, since the principle of equality between processing used and virgin materials should apply.*

Market Development

In addition to removing barriers to equality with other manufacturing sectors, there should also be major programs aimed at improving the market for recycled materials. Market development can be considered from two basic viewpoints: supply and demand.

Both aspects of the market should be developed together: the supply side, which will increase the volume and availability of recyclable material, and the demand side, which represents increased use and consumption of goods made from recycled materials. It is possible to argue that increasing final demand is the more appropriate approach, since the demand signals will work their way through to bring forth more supply. However, there are a number of instances where the existence of an abundant supply of high-quality recyclable material resulted in secondary manufacturers or exporters identifying an opportunity and moving to take advantage of it, for example, the reprocessing of plastic beverage containers by Applied Polymer Research Ltd. Both aspects of market development need to be pursued simultaneously.

Development of Supply

One means of developing the supply of recyclable materials is through separation of recyclables from other waste materials at the household level. Curbside collection of recyclable materials makes recycling very convenient. Residents simply segregate and store materials and set them out at curbside on collection days. Participation rates are high and curbside collection programs provide flexibility in the range of materials collected. Curbside collection programs also encourage the public to view waste materials as potential resources and, as a result, change attitudes, to the overall benefit of all recycling programs.

Recommendation 47: *If the City of Edmonton's curbside collection project continues to be successful, it should be continued as a regular service and gradually expanded to cover the entire city.*

CITY OF EDMONTON

Edmonton's curbside recycling project diverts high-grade waste streams of newspaper, glass, and metals from the city's landfills.

Some municipalities subsidize waste collection with funds provided from their general revenues. This practice inhibits recycling by shielding residents from the actual cost of waste collection. Recommendations 1 to 6 are intended to help with a full assessment of the costs of landfilling and payment of these the costs by the waste generator. A true assessment would help place recycling and waste collection on an equal footing. However, some municipalities may choose to continue to subsidize waste collection; in that case recycling should receive similar support.

Recommendation 48: *The provincial government should pressure those municipalities that subsidize waste collection to provide equivalent subsidies for collection of recyclables.*

Many calls for diversion credits were made at the public hearings, and suggested elsewhere. The Panel appreciates the principle behind the suggestion for diversion credits, but we feel that they would not be particularly effective in the current Alberta situation. For one thing, the currently estimated cost of landfilling is so low

that diversion credits would not provide much assistance to recycling. After the experience of siting the next generation of landfills has been incorporated, and the true and full cost of landfilling has been calculated, the impact of diversion credits could be re-evaluated.

In the meantime, the Panel believes that the principle of Recommendation 48 should apply. If a municipality wishes to subsidize the collection and landfilling of garbage, it should be prepared to provide an equivalent subsidy to recycling. It is the Panel's belief that, if recycling and garbage collection are treated equally, recycling will be able to expand its share of waste materials substantially, with no extraordinary government assistance.

Storage space is an important requirement for recycling. Suitable, convenient space is rarely available in multi-family dwellings, office buildings, and shopping malls. The design of these buildings is governed by provincial building codes and municipal bylaws. Currently municipal bylaws specify the amount of space that must be provided to accommodate the collection and storage of refuse, but similar provisions are not included for recyclable materials.

Recommendation 49: *Alberta Environment, in co-operation with Alberta Municipal Affairs, should develop a municipal bylaw provision that would provide for adequate safe and convenient storage space for recyclable materials in new multi-family dwellings, office buildings, and shopping malls.*

There are many opportunities within industry and commercial businesses to reduce waste production or to manage waste materials in a manner that facilitates their recycling. Actions taken by the private sector could reduce waste disposal costs and increase the supply of recyclables, but assistance is needed to assess these opportunities.

Recommendation 50: *The Alberta Research Council, in consultation with industry, should develop a "waste audit" program to assess waste management practices in appropriate industrial and commercial businesses and provide advice on ways to reduce waste generation.*

Landfills frequently provide opportunities to segregate materials and, like industrial and commercial sources, could be managed to become sources of recyclable materials.

Recommendation 51: *Alberta Community and Occupational Health and Alberta Environment should develop guidelines to facilitate and encourage salvaging of resources from municipal landfills.*

Segregated waste materials from one source may be of value as a feedstock for another. This principle has lead to the establishment of "waste exchanges," which provide a mechanism for advertising the availability of or the requirement for materials that might otherwise be discarded as waste. This relatively inexpensive service can potentially produce substantial benefits by increasing recycling.

Recommendation 52: *Alberta Environment and the Alberta Research Council should place a high priority on maintaining the Alberta Waste Materials Exchange and improving its effectiveness.*

The steel industry in Alberta is based entirely on reprocessing metal scrap from a variety of sources.

One of the major difficulties in the development of the recycling industry, as with all other Alberta industries, is the burden of transportation costs. All industries are looking for ways to reduce transportation costs. The following three recommendations deal specifically with

reducing transportation costs for recyclables and hence opening up additional supply areas.

There may be a good potential for using backhauls to reduce some of the transportation costs facing recyclers, as well as to benefit the trucking industry. Some recyclers already make use of backhauls. These arrangements are made on an informal basis and would be greatly assisted if there were an information system to allow truckers and recyclers to identify backhaul opportunities.

Recommendation 53: *Alberta Environment should approach the trucking industry in Alberta to establish an information system to facilitate the use of backhauls for moving recyclable materials.*

Increased recycling of non-beverage container glass seems to hinge on improving economics through reducing transportation costs, as well as diversification of the markets. The costs of transporting glass to Redcliff, Alberta, the location of the major buyer of cullet, are a major deterrent to the collection of non-deposit glass, especially in rural areas, where glass may be available only in small volumes. One means of reducing the transportation costs would be to permit non-deposit glass in reasonable quantities to be purchased at Contain-A-Way warehouses in Edmonton and Calgary. It could be processed and combined with the deposit glass to achieve economies of scale in processing and transportation.

Operations at Contain–A–Way – only deposit glass is accepted for recycling at present.

Recommendation 54: *In order to facilitate the recycling of non-deposit glass, the Alberta Liquor Control Board and Alberta Environment should investigate the feasibility and desirability of Contain-A-Way purchasing bulk loads (one tonne or more) of non-deposit glass at its warehouses in Calgary and Edmonton.*

Recommendation 54 is aimed mainly at stimulating collection of non-deposit glass by volunteer organizations. Universal depot operators also might collect non-deposit glass if they too could sell the glass to Contain-A-Way and avoid the large expense of transporting small loads of cullet to southern Alberta. Transportation costs could be minimized by piggybacking the non-deposit glass with the transport of deposit glass to Contain-A-Way's glass-processing facilities in Calgary or Edmonton.

Recommendation 55: *Alberta Environment should investigate the feasibility of including non-deposit glass from universal depots in the current system for collecting and transporting beverage containers.*

There is currently a substantial supply shortage of old corrugated cardboard and prices are high. The three recommendations below are intended to improve the handling of this commodity and bring forth more supplies of corrugated cardboard both in the short and long term.

Economic transportation of old corrugated cardboard usually requires compression and baling. In some instances, balers may be available locally that recyclers could use, but often there are concerns about liability and access to business premises. If these concerns were overcome, greater access to balers would be available.

Recommendation 56: *Alberta Environment should investigate ways for potential recyclers to have access to balers in local businesses, or liquor stores.*

In some instances, especially in rural areas where smaller, less accessible sources of old

corrugated cardboard will have to be tapped, there may be insufficient cardboard available to justify a permanent baler. Nevertheless, the material must be baled to make transportation economic.

Recommendation 57: *The feasibility of using a mobile baler to increase recycling of old corrugated cardboard in rural areas should be investigated by Alberta Environment.*

A cardboard baler is a very expensive item. Hay balers have been modified and used successfully for baling cardboard and may provide an inexpensive substitute.

Recommendation 58: *Alberta Environment should issue a call for proposals to adapt agricultural balers for baling old corrugated cardboard.*

Office buildings offer a good source of some grades of paper, but recycling programs are often difficult to implement in office buildings. Alberta Environment and several other generators have implemented office paper recycling programs, but the Alberta Environment program has not received the commitment, publicity, and recognition that it deserves. Stronger government leadership is required.

Recommendation 59: *To show government support and leadership in recycling, Alberta Environment should consider its office paper recovery program an example for other office buildings, take steps to increase public awareness of the program, and encourage implementation by other major generators, beginning initially with provincial government departments and agencies.*

Used oil is a valuable non-renewable resource. Its use as a road oil is potentially harmful to the environment and an undesirable use of a recyclable material.

Recommendation 60: *Alberta Environment should investigate methods for prohibiting the use of used oil in major road-oiling projects.*

Implementation of the above recommendation will not only avoid an environmental problem, but also will improve the supply of used oil for re-refining. Recommendations 46 and 66 provide other suggestions for assisting the recycling of used lubricating oil.

Used tires are a universal problem at landfills, where their disposal creates operational difficulties for landfill operators. Some landfill sites have special areas set aside for the storage or burial of tires. This limits the problem to a specific area of the landfill, improves management of the disposal of tires, and provides an opportunity for recovery of tires if they are needed.

Recommendation 61: *Alberta Environment and Alberta Community and Occupational Health should encourage all municipalities to place discarded tires in designated areas of the landfill to facilitate future recovery and recycling.*

Some two million tires are discarded each year in Alberta. Segregating tires in special areas of landfills would facilitate their recycling.

Plastics are increasingly used in a wide variety of products and pose problems both through littering and in landfills, primarily because of their non-biodegradable nature. A fairly high level of recycling has been achieved for industrial scrap plastics, but with the exception of the recycling of PET (polyethylene terephthalate) beverage containers, little recycling of post-consumer plastic in Alberta was brought to the attention of the Panel. Additional research aimed at improving the recycling of plastics is needed, and it should be the responsibility of the plastics manufacturers to ensure that their products are recyclable.

Recommendation 62: *Alberta, through the Minister of the Environment, should encourage Environment Canada, in conjunction with the Society of the Plastics Industry of Canada, to establish a research institute with the objective of improving the recycling of post-consumer plastics in Canada. This research institute could be funded in part by funds collected by a check-off on plastic products and in part by direct contributions from the plastics industry.*

Development of Demand

In conjunction with increasing the supply of recyclable materials, it is equally important that the demand side of the market be developed. The following are specific recommendations to increase the demand for recyclables and for materials made from recycled goods.

Among the options that should be examined for the various grades of paper are: Pacific Rim markets, improved access to United States markets, and development of local or regional end users.

Recommendation 63: *A major market survey and feasibility study should be conducted by Alberta Economic Development and Trade to determine the markets for all grades of paper, and the feasibility of accessing domestic and foreign markets.*

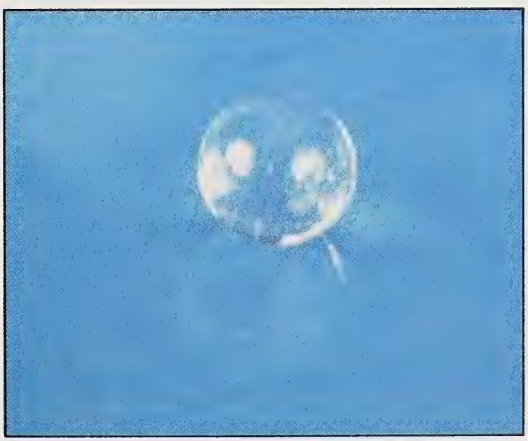
Paper stockpiled by I G Paper Recycling. Are there markets for our surplus waste paper in other parts of the world?

The use by the government of paper containing recycled fiber would set an example for others, promote the use of recycled paper and help create a market. It is the role of government to take a lead in promoting and using recycled materials where possible.

Recommendation 64: *Alberta Public Works, Supply and Services should investigate the feasibility of requesting suppliers of paper to the government to supply paper containing recycled fiber.*

Cullet can be used in the manufacture of fiberglass at levels of up to 30 percent on a continuous basis. At present the two fiberglass plants in Alberta use only small amounts of uncured scrap fiberglass generated in their manufacturing process, but they are interested in using cullet from other sources. Although the fiberglass companies would not be major users of cullet, they offer potential to diversify markets for cullet, especially in northern Alberta and for green cullet, which is usually in over-supply.

Recommendation 65: *Alberta Environment and Alberta Economic Development and Trade, in conjunction with the fiberglass industry, should undertake a study to determine the feasibility and economics of supplying cullet, especially green, for use by the fiberglass industry.*



Glass bead – beaded cullet is used in reflective signs and markers and for sandblasting. Are there additional uses for waste glass?

Expansion of used oil recycling is hampered not only by the present low value of oil, but also by poor development of markets. Neither of the two oil re-refiners in Alberta have achieved a major breakthrough into the automotive oil markets, although the re-refined oils meet all of the specifications for automobile engines. To capture a significant portion of this market would require a major effort in market development.

Recommendation 66: *Alberta Environment and Alberta Public Works, Supply and Services should work together with the used oil re-refiners to determine the market for recycled oil and to promote its use in federal, provincial, and municipal government vehicles.*

Lubie Lube – recycled oil products made by Hub Oil Ltd.

As a result of beer and soft drinks in Alberta being sold in aluminum cans, a considerable amount of aluminum is collected through the universal depots and the beer container return system. Currently, this scrap is sorted and baled in Alberta before proceeding through dealers in Calgary and Edmonton or Vancouver to markets in the United States or eastern Canada. It is possible that there is now, or soon will be, sufficient aluminum scrap recovered to support further processing in Alberta.

Recommendation 67: *Alberta Environment and Alberta Economic Development and Trade should investigate the feasibility of further processing aluminum scrap within Alberta.*

A co-operative effort is required whenever a recycling or environmental issue has the potential to be beneficial to society but extends beyond the jurisdiction of a single province. Recycling is such an issue, and a mechanism is needed to encourage co-operative efforts, especially in aspects such as markets for recycled newspaper, management of pesticide containers, investigation of landfilling costs, integration of waste exchanges, and information and education programs.

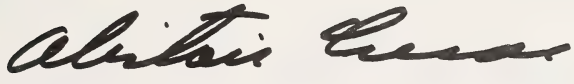
Recommendation 68: *Alberta, through the Minister of the Environment, should encourage the development of a Western Canadian Recycling Committee. The Committee's prime objective should be to promote co-operative recycling efforts across Western Canada.*

As evidenced by the status of the present recycling industry, recycling can thrive in Alberta. An already considerable recycling industry exists. If recycling is treated fairly and equitably, if it does not have to compete against subsidized waste collection and disposal services, or against industries that receive special considerations because they are using virgin materials, then recycling can expand substantially. Implementation of the Panel's recommendations would build on the existing resource recovery industry in Alberta toward even greater levels of recycling, and an ultimate objective of recycling or reusing most materials presently discarded as waste.

The Council wishes respectfully to place these recommendations and this report before you.

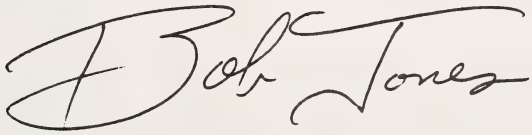
Environment Council of Alberta
Panel on Recycling of Waste in Alberta

Merrill K. Morstad, Chairman

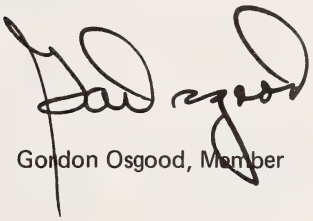


Alistair D. Crerar, Vice-Chairman

David Chan, Member



Robert M. Jones, Member



Gordon Osgood, Member

APPENDIX
Background Reports

Municipal Solid Waste — Alberta's Untapped Resource?
Brian Free. 1985

About 1.8 million tonnes of municipal solid waste are discarded each year in Alberta. This report answers questions such as: What is the composition of this waste? How is it collected, transported, and disposed of? What waste treatment practices are available to handle this waste and what might be done in the future?

A Social Perspective of Recycling in Alberta
Brian Free. 1986

In this report recycling is examined from a social perspective. What is the role of public attitudes and personal motivation? What are some of the social costs and benefits of recycling? The report also describes the involvement of individuals and groups in recycling activities.

Resource Recycling in Alberta
John Lilley. 1985

This report discusses the amounts of metals, rubber, glass, lubricating oil, plastics, and paper used and recycled in Alberta and some of the opportunities and constraints that affect increased recycling of these materials.

Garbage to Gold? Issues and Opportunities: Terms of Reference and Background Information
John Lilley. 1985

This report presents the terms of reference for the hearings, describes the hearing process, and provides a summary of the background reports, highlighting some of the issues relevant to the hearing and public consideration of the topic.

Economic Barriers to Recycling
Cal Webb. 1985

This report discusses some of the environmental advantages to recycling in the context of the flow of materials through the economy, and describes some basic economic obstacles to recycling and to increasing the supply of and demand for recycled products.

The Use of Municipal Waste as Fuel (reprint)
Cal Webb. 1983.

This report, prepared in 1983, reviews literature related to the use of municipal waste as a fuel for power generation and discusses some of the options that involve separation and processing of usable elements in the waste. The report also describes some issues relevant to discussion of landfilling versus energy and resource recovery options.

Legislation, Policies, and Programs Affecting Recycling in Alberta
Tom Rogers. 1986

This report, prepared by and available from Alberta Environment, describes and discusses legislation, policies, and programs in Alberta that affect recycling. Included are reviews of the Beverage Container Act, the Oil Drop Program, Alberta Environment's Municipal Resource Recovery Program for assisting local recycling efforts, and the Alberta Waste Materials Exchange.

Bibliography of Recycling
Brian Free (comp.). 1986

This is a bibliography of reference materials used in the preparation of the background reports. Sources and call numbers are provided where available.

Video Tape

The Environment Council of Alberta, in co-operation with Alberta Environment, also has prepared a video tape called *One Man's Garbage, Another Man's Gold?* This 15-minute video tape was used during the information program to provide an overview of recycling in Alberta and discussion of some future options. It may be borrowed from the Environment Council Library.

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